

Tariff Filing of Green Mountain)
Power Corporation)
Requesting a 12.9% Rate Increase)

Summary: Mr. Mosenthal's testimony addresses GMP's efforts to pursue all cost-effective C&I energy efficiency savings during and after the cost recovery period. It also proposes specific ACE adjustments to GMP's C&I programs.

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EXHIBITS

Exhibit DPS__PHM-1	Philip Mosenthal Resume
Exhibit DPS__PHM-2	GMP response to DPS 1-14
Exhibit DPS__PHM-3	GMP response to DPS 1-66
Exhibit DPS__PHM-4	Internal GMP memorandum 2/12/96 re: Changes in Customer Incentive Levels for C&I Energy Efficiency Programs
Exhibit DPS__PHM-5	Grimason 8/31/98 deposition, p.77
Exhibit DPS__PHM-6	GMP response to DPS 1-42b
Exhibit DPS__PHM-7	GMP response to DPS 1-40
Exhibit DPS__PHM-8	GMP response to DPS 4-45
Exhibit DPS__PHM-9	Grimason 8/31/98 deposition, p. 76
Exhibit DPS__PHM-10	ACE Adjustments

Exhibit DPS__PHM-11	Internal GMP memorandum 8/8/97 re: Savings From High Efficiency Packaged Terminal Heat Pumps and Occupancy Sensors or Motel.
Exhibit DPS__PHM-12	GMP response attachment to DPS 4-50a
Exhibit DPS__PHM-13	Grimason 8/31/98 deposition, pp. 80 - 82
Exhibit DPS__PHM-14	7/3/96 GMP letter to Act 250 customer
Exhibit DPS__PHM-15	11/7/96 internal GMP memorandum re: Policy For Act 250 Projects.
Exhibit DPS__PHM-16	1/20/98 Internal GMP e-mail re: C&I New Construction Program Act 250 Referrals.
Exhibit DPS__PHM-17	Grimason 8/31/98 deposition, pp. 72 -74

1 **VERMONT DEPARTMENT OF PUBLIC SERVICE**

2 **BEFORE THE VERMONT PUBLIC SERVICE BOARD**

3 **DOCKET NO. 6107**
4 **DIRECT TESTIMONY OF**

5 **PHILIP H. MOSENTHAL**

6 **I. INTRODUCTION AND SUMMARY**

7 A. *Witness Identification And Qualifications*

8 **Q: State your name, position, and business address.**

9 A: My name is Philip H. Mosenthal. I am Senior Vice President of Optimal Energy, Inc.
10 ("OEI"). My office is at 66 Main Street, Middlebury, Vermont 05753.

11 **Q: On whose behalf are you testifying in this proceeding?**

12 A: My testimony is sponsored by the Vermont Department of Public Service (DPS).

13 **Q: Please summarize your qualifications.**

14 A: I have worked on energy efficiency for 15 years in the government, non-profit and
15 private sectors. In the 1980's I worked primarily in implementation, working directly
16 with commercial, industrial and multifamily building owners analyzing energy
17 efficiency measures. My focus since 1990 has been on DSM planning, program
18 design, and evaluation, as a consultant for numerous utilities and non-utility parties,
19 in the U.S., Canada and Europe.

20 From 1990 until 1995, I worked for XENERGY Inc., a utility consulting firm
21 specializing in DSM, ultimately as Chief Consultant for its MidAtlantic region. In
22 1995 I joined Resource Insight, Inc. (RII) as a Senior Research Associate. RII is a

1 Massachusetts firm specializing in utility supply and demand issues. In May 1996, I
2 co-founded Optimal Energy, Inc. (OEI) headquartered in Middlebury, VT with John
3 Plunkett. OEI provides economic and technical analysis on DSM and energy
4 efficiency issues to utility and non-utility clients throughout North America. I have a
5 *B.A.* in Design of the Environment, and an *M.S.* in Energy Management and Policy,
6 both from the University of Pennsylvania.

7 My resume is Exhibit. DPS__PHM-1.

8 **Q: Have you previously testified before the Public Service Board in Vermont?**

9 A: Yes. In Docket Nos. 5980, 5983 and 6018.

10 **Q: Have you testified in regulatory proceedings in other jurisdictions?**

11 A Yes. I have testified before the Ontario Energy Board, on the joint DSM plan of
12 Centra and Union Gas Companies, and on the DSM plans of Consumers Gas
13 Company, both on behalf of the Green Energy Coalition in EBRO 493/494 and
14 EBRO 497, respectively.

15 **Q: Summarize your relevant DSM experience.**

16 A: Since 1990 I have specialized in electric DSM planning and program design. I have
17 designed numerous DSM programs addressing residential, commercial and industrial
18 consumers for utilities throughout North America and in Europe. I have performed
19 process and impact evaluations of DSM programs. I have also assisted electric and
20 gas utilities in DSM planning, including assessing the available DSM potential in
21 their service areas, and integrating DSM with supply costs through cost-benefit
22 analysis. In addition to my utility work, I have reviewed and proposed changes to
23 utility DSM plans and program designs on behalf of numerous non-utility parties.
24 Selected utility clients include: Potomac Electric Power Company, Consolidated
25 Edison of New York, Burlington Electric Department, Citizens Utilities (Vermont

1 Division), Omaha Public Power District, Public Service Electric and Gas, Ontario
2 Hydro, New York Power Authority, Southern Minnesota Municipal Power Agency,
3 American Electric Power, Tennessee Valley Public Power Authority, Orange and
4 Rockland Utilities, Public Service of New Mexico, Georgia Power Company, and
5 Grupo Endesa (Spain).

6 I recently served as the lead consultant for the Vermont DPS on the design and
7 development of core energy efficiency programs and analysis of the economically
8 achievable efficiency potential in Vermont as part of the DPS Energy Efficiency Plan
9 in Docket 5980.

10 *B. Summary Of Testimony*

11 **Q: Please summarize your testimony.**

12 A: My testimony shows that GMP has failed to take action designed to pursue all cost
13 effective energy efficiency savings during the cost recovery period covered by this
14 Docket, and also subsequent to the expiration of the MOU in Docket No. 5857 and
15 the Board Order in Docket No. 5983. I discuss specific examples of actions GMP
16 was aware of and could and should have taken. I further show how the failure to
17 take action has resulted in substantially less DSM savings than could have been
18 achieved.

19 My testimony also proposes specific adjustments to GMP's ACE claims for
20 C&I savings during the cost recovery period of April 1 to December 31, 1997.
21 These derive from overstatement of savings in GMP's two C&I programs:
22 Equipment Replacement and New Construction.

23 **Q: What has GMP stated about its DSM performance?**

24 A: The testimony of Witness Grimson and GMP's 1997 Annual Report claim that
25 GMP has been exemplary in its DSM performance, particularly with respect to the

1 commercial and industrial sectors that I address in this testimony.

2 GMP points out how it has exceeded savings goals, while spending less than
3 originally budgeted for DSM. It further explains how it has significantly reduced the
4 costs of capturing savings, achieving an average annual “productivity increase” of
5 19%.¹ GMP also boasts that it has succeeded in refocusing its Equipment
6 Replacement Program to capture discretionary retrofit opportunities and that this
7 program has successfully achieved comprehensive savings among retrofit customers.

8 **Q: Given the above, why are you concerned about GMP's performance?**

9 A: My testimony shows that GMP has knowingly failed to capture a large portion of
10 cost-effectively achievable savings and has not taken steps to remedy the situation.
11 This is of particular concern in the post-cost-recovery period when GMP was no
12 longer under cover of an MOU, and had ample guidance from the DPS and the
13 Board.

14 The fact that GMP has apparently exceeded savings goals while underspending
15 its budget must be considered in context. In fact, GMP's savings and spending on
16 DSM have *declined each year* since their peak in 1993. I demonstrate in this
17 testimony how GMP has set unrealistically low goals, both given its prior experience
18 and the potential opportunities that exist in its territory. I further show that GMP's
19 claims that it is effectively addressing the retrofit market and achieving
20 comprehensive savings are not true.

21 In addition, GMP's claims of “productivity improvements” are not directly
22 relevant to the issue of pursuit of all cost effective DSM, and simply show they had
23 the budget and ability to do more. In addition, I show that these productivity
24 improvements were, at least in part, a function of natural program maturation and

¹ Grimason prefiled direct testimony, p. 7.

1 accounting and measurement changes.

2 **II. FAILURE TO PURSUE ALL COST EFFECTIVE SAVINGS**

3 **Q: Summarize your concerns about GMP's failure to pursue all cost effective**
4 **savings.**

5 A: Condition 8 of the Board approved Hydro Quebec contract in Docket No. 5330
6 requires GMP and the other Vermont Joint-Owners to take action designed to
7 achieve all cost-effective energy efficiency savings. GMP's activities in terms of both
8 planning for the future acquisition of all cost-effective savings and its current
9 delivery of DSM services evidence a clear choice by GMP not to strive to capture all
10 cost-effective DSM opportunities. My testimony shows:

- 11 • GMP was aware of numerous potential opportunities to capture
12 additional cost effective savings in 1998.
- 13 • GMP failed to even consider these opportunities subsequent to
14 expiration of the MOU in Docket No. 5857 and the Board Order in
15 Docket No. 5983.
- 16 • GMP resisted adopting program improvements suggested by the DPS
17 to increase the capture of cost effective savings.
- 18 • GMP admits that adoption of some of these strategies would have
19 resulted in the capture of more cost effective savings.
- 20 • GMP's redefinition of lost opportunity programs as including retrofit is
21 simply a label, and does not include appropriate modification of the
22 program to systematically capture comprehensive retrofit opportunities.
- 23 • During the cost recovery period GMP failed to capture all but a tiny
24 fraction of the cost-effectively achievable C&I potential, as

1 demonstrated both by planning estimates and GMP's own
2 accomplishments earlier this decade.

3 A. *Failures in DSM Planning*

4 **Q: Explain your concerns about GMP's failure to plan to capture all cost effective**
5 **savings.**

6 A: GMP continues to deliver DSM programs agreed to in the MOU in Docket 5857,
7 which expired at the end of 1997. This is despite extensive evidence in Docket No.
8 5983 that additional cost effective opportunities exist that GMP is not currently
9 targeting, including substantial cost effective C&I retrofit potential. The Board
10 Order in Docket 5983 was issued on February 28, 1998. It, and the extensive
11 evidence leading up to it, clearly put GMP on notice that it was in danger of being
12 found not in compliance with Condition 8 if it continued on the DSM track it was
13 on.

14 While we are very concerned that the Company did not make
15 sufficient efforts to acquire all cost-effective DSM resources, there is
16 no dispute that what it did acquire was in fact cost-effective and
17 largely consistent with the MOU....Lastly, we are very troubled by
18 the attitude of the Company revealed in the May 10, 1996,
19 memorandum....These [GMP] statements may be symptomatic of a
20 general reluctance of the Company to fulfill its obligations under the
21 law; if so, *it cannot be tolerated. We expect the Company to take all*
22 *necessary actions to acquire all cost-effective energy efficiency and*
23 *conservation savings in its service territory, as it is required to do so*
24 *under 30 V.S.A. 218c, Docket 5270, and Condition 8. Evidence in*
25 *the future of the failure to do so could result in the imposition of*
26 *substantial disallowances and penalties.* (Emphasis added).²

27 The Board goes on to state:

² Board Order, Docket 5983, February 28, 1998 at 144-145

1 Condition 8 still applies to GMP. The Company must understand that
2 continuing its DSM programs as currently designed and implemented
3 could support a finding that it is not in compliance with Condition 8.
4 In the future, the absence of strong evidence that the Company is
5 making good faith efforts to acquire *all* cost-effective DSM resources
6 throughout its territory may still result in the imposition of substantial
7 penalties. (Emphasis retained from original.)³

8 **Q: But hasn't GMP made a number of changes to DSM programs subsequent to**
9 **the Order in Docket No. 5983?**

10 A: Yes. GMP's response to DPS 1-14 (Exhibit DPS__PHM-2) details *all* the changes
11 *made or considered* subsequent to Docket No. 5983. I focus here on the C&I
12 changes. Unfortunately, while in some cases reasonable, these changes are either
13 decisions to continue promoting measures already promoted (not really a change), a
14 relaxation of a \$1,000 incentive cap for T8 lighting for certain customers, or
15 accounting changes that only affect the way GMP estimates savings and ACE.⁴
16 None of them represent changes *or even consideration* of substantive new program
17 concepts or strategies that GMP should have been exploring to ensure they were in
18 compliance with Condition 8.

19 **Q: Did GMP have time subsequent to the Order in Docket No. 5983 to pursue**
20 **changes?**

21 A: Absolutely. While fully implementing major changes in program delivery strategy, or
22 roll out of completely new programs might take longer than 6 months, GMP
23 certainly had ample opportunity to begin the process of analyzing alternative

³ *Op cit.* at 261

⁴In fact one change — use of retrofit savings calculations based on existing equipment efficiencies — is inappropriate for the Equipment Replacement program and will result in the overestimation of long term savings.

1 programs and program component concepts and strategies. What is even more
2 disturbing is that GMP has been given ample guidance — starting in early 1997 in
3 Docket No. 5983, and even earlier in the core program working groups — of areas
4 that it should investigate. The fact that GMP has not produced even a single analysis
5 or document related to consideration of a possible new approach, yet has expended
6 significant resources litigating DSM, clearly shows that GMP's main focus has not
7 been the minimization of its customers' total energy costs.

8 **Q: Can you provide examples of the guidance GMP has been provided in Docket**
9 **No. 5983 and the core program working groups on areas where it might**
10 **investigate new opportunities?**

11 A: Yes. I provide two selected examples. First, in Docket No. 5983 extensive testimony
12 and analysis was presented showing that GMP's former C&I retrofit programs
13 canceled in 1994 were highly cost effective at the time, and still would be when
14 screened against the avoided costs stipulated to in the MOU in Docket No. 5857
15 and currently being used by GMP.

16 GMP did not dispute the accuracy of the screening results. Rather, it argued in
17 Docket No. 5983 that: 1) it was protected from having to re-institute these
18 programs because of the MOU; 2) it was unaware of the methodology for screening
19 presented by the DPS; and 3) the MOU prevented GMP from using the
20 methodology. GMP however, never claimed the methodology was inappropriate.

21 DPS witnesses in Docket No. 5983 also argued that GMP should not have
22 canceled the C&I MRV programs if they were still cost effective.⁵ GMP has claimed
23 these programs were successful.⁶ In fact, in its Order in Docket No. 5983 the Board

⁵ Board Order in Docket 5983, February 28, 1998 at 143.

⁶ *id.*

1 noted that “Once GMP met its savings objectives, it terminated the program [MRV
2 Energy Project] — yet there were significant savings still available.⁷ In addition, the
3 response to DPS 1-66 (Exhibit DPS__PHM-3) shows that GMP’s own recent
4 screening of the MRV Small C&I Program using the MOU avoided costs
5 determined it was highly cost effective, with a 2.2 benefit-cost ratio.⁸ GMP also
6 indicates it failed to screen any possible programs for targeted deployment in DU
7 constrained areas subsequent to Docket No. 5983.⁹

8 Second, the DPS has presented strategies for improving the
9 comprehensiveness of C&I programs in the core program working groups, as early
10 as the spring of 1996. These included: strategies to minimize free riders for T8
11 lighting while ensuring lighting participants do all cost effective lighting measures;
12 strategies to encourage a comprehensive, multi-end-use approach to implementing
13 heating or cooling load reduction measures along with high efficiency HVAC
14 equipment and proper sizing and installation; and an incentive structure that requires
15 comprehensive treatment of all end uses in new construction buildings.

16 **Q: Mr. Grimason claims that GMP has been a leader in the core program**
17 **working groups, and creatively advanced new strategies. Do you agree?**

18 A: No. GMP’s response to DPS 1-12 paints a picture of GMP as the prime mover
19 behind an aggressive approach to developing new and innovative approaches to
20 capturing all cost effective DSM. Unfortunately, this has not been my experience, as
21 a participant in the early core program working group meetings. The DPS initiated

⁷ *op. cit.* at 260-261.

⁸ Note that this is even despite GMP failing to include the “timing effects” discussed in Docket No. 5983, and which they were clearly fully aware of at the time of screening.

⁹ Response to DPS 1-67.

1 the core program working group process and made proposals for new program
2 components and features in early 1996. At the time, GMP and other utilities resisted
3 adoption of these changes designed to increase the net benefits from C&I programs,
4 improve the comprehensiveness of savings, minimize free ridership, and transform
5 markets. In addition, GMP did not propose alternative strategies intended to achieve
6 these objectives. One of GMP's claims of leadership is based on its modification to
7 motor baseline assumptions for 1998 and beyond. This change was advocated by the
8 DPS in 1996. At the time, the DPS was unable to obtain agreement from GMP and
9 other utilities.

10 **Q: Do you have any other concerns about GMP's lack of innovation in improving**
11 **its DSM?**

12 A: Yes. While GMP claims it met its savings goals for 1997, it substantially underspent
13 its DSM budget.¹⁰ I believe GMP had ample opportunity in 1997, once realizing it
14 was likely to underspend, to pursue additional efforts to maximize savings within the
15 guidelines of the MOU in Docket No. 5857. In fact, Mr. Grimason has indicated that
16 he convened a meeting of his staff in 1997 for just this purpose. The only strategy
17 Mr. Grimason recalls he and his staff came up with was to provide the Energy
18 Services staff a financial incentive to more aggressively pursue opportunities.¹¹

19 **Q: How does this behavior compare to GMP's actions when it appears it may**
20 **overspend its stipulated budgets?**

21 A: In this instance, GMP has taken immediate action to limit spending in the critical lost
22 opportunity markets. Exhibit DPS__PHM-4 is a February 1996 memo from the C&I

¹⁰ Further, GMP's 1997 budget was itself substantially below the amount agreed upon in the 5857 MOU.

¹¹ Grimason deposition transcript of August 31, 1998. transcript at p. 40, l. 11 - p. 43, l. 2.

1 programs manager to field and operations staff concerning the C&I Equipment
2 Replacement and New Construction Programs. It shows that, because of concerns
3 its C&I lost opportunity programs would be “oversubscribed,” GMP immediately
4 and drastically cut its rebates for custom measures.¹² This reduction was not
5 reversed after the Board’s Order in 5983 or subsequent to the expiration of the 5857
6 MOU.

¹² Given that lost opportunities are by definition driven by market events, and that GMP should attempt to capture all cost effective lost opportunity resources, consistent with Board Orders in Docket Nos. 5270 and 5330, it is not clear how a lost opportunity program can be “oversubscribed.”

1 **Q: Didn't the GMP C&I programs manager contend that this change would not**
2 **have a negative impact on participation?**

3 A: The memo does indicate this. However, this assertion lacks credibility. Studies have
4 shown a clear and direct relationship between program participation and incentive
5 levels. In fact in his deposition Mr. Grimason confirmed that higher incentives will
6 attract greater participation Grimason 8/31/98 deposition, p. 77, lines 16-23
7 attached as Exhibit DPS__PHM-5.

8 *B. Failure to Pursue Cost Effective Retrofit Savings*

9 **Q: Hasn't GMP compensated for the elimination of C&I retrofit programs by**
10 **modifying its Equipment Replacement program to capture the retrofit**
11 **potential?**

12 A: No. GMP notes that the Equipment Replacement program was modified in 1994 to
13 be available to all customers, regardless of whether they were previously planning to
14 replace equipment. However, it is still designed to target lost opportunities. The
15 services and incentive structure are consistent with a lost opportunity program, and
16 are in fact less aggressive than both those proposed by the Department for the core
17 C&I Market Opportunities program and those offered by GMP in the Equipment
18 Replacement Program prior to its redefinition as covering the retrofit market.¹³

19 **Q: What evidence has GMP provided that the Equipment Replacement program**
20 **is really a retrofit program?**

21 A: None. GMP claims in response to DPS 1-42b (Exhibit DPS__PHM-6) that it

¹³ In fact, Mr. Grimason stated in his deposition that the program originally provided incentives of 100% of incremental cost for all custom measures (8/31/98 deposition transcript at p. 50, line 14 to p. 52, line 14.

1 provides customers with technical assistance, therefore encouraging discretionary
2 retrofits. While I commend providing technical assistance, this alone does not make
3 the program an aggressive retrofit program. In fact, GMP acknowledges that they
4 provided these same services *prior* to cancellation of its separate retrofit programs in
5 1994.¹⁴ Further, GMP's amended response to DPS 1-40 (Exhibit DPS__PHM-7)
6 shows that GMP is unable to tell the DPS how many audits it performed in 1997,
7 how it determined when a customer is a retrofit customer, or how many of its 1997
8 participants have installed retrofit measures.

9 Finally, the only modifications GMP has made to the Equipment Replacement
10 program since it claims to be also targeting discretionary retrofits is to *reduce*
11 incentives (see Exhibit DPS__PHM-4). Given that incremental costs are typically
12 only a small fraction of the total installed measure cost for discretionary retrofits,
13 these incentives are not sufficient to convince most customers not already planning a
14 retrofit to pursue one.

15 **Q: Is GMP able to estimate how many C&I retrofit customers it is treating in**
16 **1998?**

17 A: Yes. It is now tracking retrofit customers. In response to DPS 1-47 GMP has
18 indicated it had 11 retrofit participants in the first half of 1998. This computes to an
19 average annual participation level of 22 customers.

20 **Q: How does this compare to GMP's historic record of retrofit participation?**

21 A: It is extremely low. In 1993, the last year GMP offered full scale C&I retrofit
22 programs, it had 747 non-farm and 145 farm participants. *This is over 4,000% more*
23 *than its current rate.* Even in the Mad River Valley alone GMP captured 124 C&I
24 retrofit participants in 1996.

¹⁴ Grimason, 8/31/98 deposition transcript at p. 53, lines 20 - 24.

1 I. **FAILURE TO ACHIEVE COMPREHENSIVE SAVINGS**

2 **Q: Do you have any evidence that the technical assistance and incentive structure**
3 **GMP provides in the Equipment Replacement Program are not sufficient to**
4 **induce comprehensive retrofits?**

5 A: Yes. Exhibit DPS__PHM-7 shows that only 6.0% of Equipment Replacement
6 participants installed measures addressing more than one end use, and only a single
7 customer (0.4% of participants) covered more than two end uses. I would expect a
8 comprehensive retrofit program to identify opportunities among all end uses in most
9 customer facilities. Combined with aggressive financial strategies, I would expect to
10 have a substantial portion of these cost effective opportunities captured.

11 **Q: Hasn't GMP achieved much more comprehensive savings in the Equipment**
12 **Replacement program in 1997 than in prior years?**

13 A: No. GMP argues this is the case based on a simplified analysis that looks only at
14 how savings break out by end use.¹⁵ However, a more detailed assessment shows
15 that the program is not fully comprehensive.

16 First of all, comprehensiveness refers to the capture of all, or most, cost
17 effective opportunities from each participant. It does not refer solely to capturing
18 savings among different end uses from different customers, nor from capturing only
19 non-lighting savings. The fact that only 6% of customers installed measures among
20 more than one end use is evidence of a lack of comprehensiveness.

21 Second, GMP's 1997 Annual Report shows that, while 46% of C&I DSM
22 savings in 1997 came from lighting, a comparison by *participant* shows that a
23 smaller portion of program participants installed non-lighting measures in 1997 than

¹⁵ Grimason prefiled direct testimony, p. 7-8.

1 in 1992. The “Customers With Installations” data in the Annual Reports shows that
2 26% were non-lighting in 1992, going down to 21% in 1997.¹⁶

3 **Q: Explain how the portion of savings have gone down from lighting while at the**
4 **same time the portion of customers installing non-lighting measures has gone**
5 **down as well.**

6 A: In 1997 GMP claimed very large non-lighting savings from a small number of very
7 large customers; particularly from industrial process and variable speed drive
8 measures. For example, in the Equipment Replacement Program during the cost
9 recovery period the 5 largest projects account for just under half of the total
10 program savings.¹⁷ What is more significant in terms of comprehensiveness is that
11 these large projects generally only addressed one or a few types of measures. For
12 example, GMP claims 716 MWh (15% of the total program cost recovery period
13 savings) for its largest project from the installation of just two variable speed drives.
14 This customer is a large hospital, that no doubt had other cost effective
15 opportunities.

16 2. *FAILURE TO CAPTURE ALL ACHIEVABLE POTENTIAL*

17 **Q: GMP significantly exceeded its savings goals, while spending less than**
18 **projected. Doesn’t this show that GMP is exceeding expectations for good**
19 **DSM?**

20 A: No. Meeting or surpassing self-set goals is not itself a criterion for defining good
21 DSM practice. One must consider a number of things: what the original goals were;

¹⁶ Data from pp. 8 and 9 of the Executive Summaries in the 1992 and 1997 Annual Reports, respectively.

¹⁷ GMP response to DPS 1-39.

1 whether they are being met or surpassed through comprehensive savings from a
2 wide spectrum of customers or from cream skimming or a few very large customers;
3 and how the goals and savings compare with the potential for cost effective savings
4 among the target markets.

5 In the case of GMP, all of these issues come into play. DPS witness Parlin
6 shows how GMP's goals bear little or no relationship to actual cost effective
7 potential, or past experience. Put simply, GMP has consistently projected savings
8 lower than it achieved in prior years, and a utility cost per lifetime MWh higher than
9 it experienced the year before. Under this approach, GMP can exceed savings goals
10 and come in under cost goals each year, while doing no better or even worse than
11 the year before.

12 **Q: Do you have an example of this approach?**

13 A: Yes. GMP's approach to setting goals is exemplified by its response to DPS 4-45
14 (Exhibit DPS__PHM-8). In this response GMP explains that 1998 Equipment
15 Replacement Program goals reflect a change in its method of calculating savings
16 from "retrofit" projects that *increases* claimed savings. The new "increased" goal is
17 3,825 MWh. It is ironic that this "higher" goal is only 79% of actual 1997 savings.
18 What is even more disturbing is that GMP claims it has no workpapers to support
19 calculation of this goal. When asked about this, Mr. Grimason explained that GMP
20 picks a number after considering past performance but does not perform any
21 calculations or analysis to develop goals.¹⁸

22 **Q: Can you comment on GMP's claim that it has improved its DSM productivity?**

23 A: Yes. Numerous factors have occurred since GMP began DSM in 1992 that
24 contribute to GMP's claimed reduction in its cost per lifetime MWh saved. They

¹⁸ Grimason 8/31/98 deposition transcript p. 87, line 6 - p. 88, line 9.

1 include: moving from start-up to mature programs (substantial reductions in
2 administrative costs); moving from discretionary retrofit to lost opportunity
3 programs (these are cheaper resources, and require less assistance and customer
4 “handholding”); use of longer measure life assumptions (increases lifetime MWh
5 estimates); overstatement of savings (further discussed below); use of significantly
6 lower payroll adders applied to GMP labor costs; the capture of a very large portion
7 of savings from a small group of very large customers (cheaper savings and lower
8 transaction and service costs); a shift away from residential to C&I savings (C&I
9 opportunities are generally lower cost and less labor intensive to acquire); and lower
10 incentive levels that have also reduced participation and net benefits.

11 As a result, I would naturally expect to see GMP capture savings at a
12 substantially lower cost per lifetime MWh. What concerns me is that GMP has not
13 used this to enable it to capture more savings, while still remaining within its budget.
14 In addition, if GMP were actually working to capture all cost-effective savings, I
15 would expect the gradual depletion of the savings resource to put upward pressure
16 on costs. The fact that the opposite has happened is consistent with my belief that
17 GMP is performing at a level well below what is cost-effectively achievable.

18 **Q: Please address some of the other issues you raised about goal setting.**

19 A: I have discussed above the concern about GMP’s lack of comprehensiveness that
20 results directly from failing to offer programs that aggressively target all cost-
21 effective retrofit opportunities. I have also pointed out the large portion of GMP’s
22 C&I savings that came from a handful of very large projects.

23 Perhaps the best measure of the reasonableness of DSM goals and actual
24 achievements is a comparison with cost effective potential. GMP is capturing only a
25 small fraction of the achievable cost effective *lost opportunity* potential from its C&I
26 programs, and is hardly making a significant dent in the retrofit potential. For

1 example, assuming GMP's share of statewide core C&I program savings would be
2 39%,¹⁹ cost-effectively achievable savings from mature C&I programs are estimated
3 at approximately 12,000 MWh.²⁰ This is almost double GMP's claimed 1997 C&I
4 savings, and almost three times its 1997 projections. This relationship is even more
5 dramatic when comparing the residential sector (See Table 1 below). In addition, the
6 core program estimates use higher free rider estimates than GMP for C&I savings.
7 Use of GMP's lower freeridership estimates would increase the core program
8 figures.

9 I show below, under a more detailed discussion of free ridership, how GMP's
10 C&I lost opportunity programs are not reaching a very high level of market
11 penetration among the prescriptive technologies promoted for the natural
12 replacement market alone.

13 **Q: How do GMP's 1997 DSM savings and goals compare to estimates of the total**
14 **cost-effectively achievable potential, including retrofit opportunities?**

15 A: They are a very small portion. In its Energy Efficiency Plan filed with the Board in
16 Docket No. 5980 the Department estimated total existing economically achievable
17 potential of 1,315 GWh. GMP's share would be approximately 513 GWh. At the
18 rate GMP is claiming to capture savings, it would take over fifty years to capture
19 this potential.²¹

¹⁹ GMP's actual 1995 C&I electricity sales represented 39% of total Vermont C&I electricity consumption (Jan. 1997 DPS Biennial Report, pp. 23, 24). In actuality, it is likely that GMP's share of core program savings would be larger because of the higher than average rate of new construction in its territory.

²⁰ This is based on the DPS estimate of annual incremental savings for the C&I MOP and new construction program in year five. GMP has provided its C&I DSM programs for more than five years.

²¹ In actuality GMP would never capture all the efficiency potential because new opportunities for

1

Table 1
Comparison of GMP 1997 Goals and Claimed Savings with Cost-Effectively Achievable Savings

	GMP share of Core Lost Opportunity ²² (MWh)	GMP share of Total Economically Achievable Potential (MWh)	GMP 1997 Goals			GMP 1997 Claimed Actuals			
			Net MWh	% of Core	% of Total ²³	Net MWh	% of Core	Gross MWh	% of Total
C&I	12,116	271,547	4,270	35%	1.6%	6,794	56%	7,922	2.9%
Res	6,202	241,303	1,008	16%	0.4%	1,366 ²⁴	25%	1,731	0.7%
All	18,318	512,850	5,278	29%	1.0%	8,328	45%	9,653	1.9%

2 **Q: How do GMP's current DSM achievements compare to those when it delivered**
3 **C&I retrofit programs?**

4 **A:** GMP has made the claim that its Equipment Replacement Program sufficiently
5 addresses both the lost opportunity and discretionary retrofit markets. The above
6 numbers show that this program does not come close to capturing all the achievable
7 savings in these markets. In addition, GMP's current accomplishments are far shy of
8 capturing the level of participation and savings it achieved when it offered separate
9 programs specifically designed to capture retrofit savings.

cost effective savings would continually develop from new construction and advancing technology.

²² Includes the low income program to make a proper comparison with GMP's programs, which also include low income.

²³ Percentages reflect *net* MWh as a percent of total. Percentages reflecting *gross* MWh would be slightly higher. However, gross MWh goals are not readily available.

²⁴ Revised estimate per June 2, 1998 letter to the Board from GMP.

1 **Q: Please provide an example of this.**

2 A: In 1997 GMP claims it captured net annualized savings of 6.8 GWh, and had 382
3 participants in its C&I programs. In contrast, in 1993 GMP obtained 16.8 GWh of
4 savings while serving 1,031 customers in its C&I programs. If the Equipment
5 Replacement Program were as successful at capturing retrofit savings as GMP's
6 former retrofit programs I would not expect savings and participation to be only
7 40% of what GMP was able to achieve in only its second full year of DSM delivery.

8 **Q: Does GMP concur with your assessment that re-instatement of programs**
9 **modeled on its former C&I retrofit or MRV programs would result in the**
10 **capture of increased cost-effective savings?**

11 A: Yes. Mr. Grimson confirms this quite clearly in his deposition (Exhibit
12 DPS__PHM-9, 8/31/98 Grimson deposition p. 76, lines 14-19) This shows that
13 GMP is intentionally not pursuing all cost effective DSM.

14 **Q: Please summarize your findings regarding GMP's pursuit of all cost effective**
15 **energy efficiency savings?**

16 A: I conclude that GMP has not taken the Board's admonitions seriously. Its position
17 that it has been pursuing all cost effective energy efficiency savings cannot be
18 accepted given the drastic reduction in C&I savings and participation as compared
19 to historic levels and estimates of cost-effectively achievable potential. The fact that
20 Mr. Grimson admits that delivery of C&I retrofit programs would result in the
21 capture of more cost-effective savings makes clear that it is ignoring its obligations
22 under 30 V.S.A. 218c, Docket 5270, and Condition 8.

23 **Q: Are there any other issues related to GMP's savings claims?**

24 A: Yes. In some instances I believe GMP has overstated savings. As a result, its
25 performance reported in its 1997 Annual Report and witness Grimson's testimony

1 appears better than it really is. I discuss specific instances of savings overstatements
2 below.

3 **III. GMP'S OVERSTATEMENT OF C&I SAVINGS**

4 **Q: Please summarize the specific instances where GMP has overstated savings**
5 **claimed for ACE.**

6 A: Below I address five areas where GMP has overstated actual C&I savings
7 attributable to its efforts.

- 8 1. GMP underestimates the free ridership factors for T8 and T12
9 lighting and for high efficiency motors. This results in a significant
10 overestimate of savings from these measures.
- 11 2. GMP overestimates motor savings from improper reliance on a low
12 baseline.
- 13 3. GMP improperly calculates the savings associated with variable
14 speed drives (VSD).
- 15 4. GMP improperly attributes savings from a motel to its actions.
- 16 5. GMP improperly attributes lighting savings among ACT 250
17 customers to its actions.

1 **Q: What is the total reduction in savings and resultant ACE adjustments you**
2 **propose?**

3 A: Exhibit DPS__PHM- 10 and the testimony below itemizes the savings reductions
4 and ACE adjustments for each category. The total reduction in annualized savings
5 during the cost recovery period is 1,050 MWh. This represents a reduction to
6 GMP's claimed C&I savings for the cost recovery period of 17%. I propose an
7 adjustment to ACE of approximately \$51,989.

8 A. *Overstatement of Savings from Low Free Ridership Estimates*

9 **Q: Explain why GMP is overstating savings because of low free ridership**
10 **estimates.**

11 A: GMP is claiming savings during the cost recovery period totaling 491 MWh for the
12 installation of T8 lights, 58 MWh for the installation of T12 lights, and 262 MWh
13 for the installation of high efficiency motors in its C&I programs. GMP calculates
14 these savings using a 15% free ridership factor. However, I believe the actual free
15 ridership factors are much higher, in some cases approaching 100%.

16 **Q: Please explain your concern with GMP's T8 free ridership estimate.**

17 A: T8 lighting is becoming more and more common as a replacement for the less
18 efficient, higher life-cycle cost, T12 technology. This is the result of a number of
19 things, including lower incremental costs, natural market penetration increases over
20 time, greater awareness of T8 technology by vendors and contractors, and possibly
21 past efforts by GMP and other utilities in promoting the technology. GMP, along
22 with CVPS, solicited an assessment of the lighting and motor markets in their
23 territories in 1997.²⁵ This study estimated both the natural market penetration of

²⁵ Pacific Energy Associates, *C&I Market-Driven Programs Market Assessment and Process*

1 T8s and the portion induced by GMP's Equipment Replacement program during a
2 twelve month period from mid-1995 to mid-1996.

3 The study determined that 67% of replacement ballasts, and 70% of ballasts in
4 replacement or new fixtures sold in GMP's territory were electronic. Of these, 81%
5 were T8 (i.e., 54% (0.67×0.81) and 57% (0.7×0.81) of total ballasts, respectively).
6 Further, the study concluded that GMP's program only achieved a 13-14%
7 participation rate,²⁶ or only a small portion of those that were already installing T8s.
8 The study concluded that "These [lighting market] comparison points indicated that
9 GMP and CVPS's penetration into the market is fairly modest, raising doubt about
10 whether these programs could be having much of an impact on the overall
11 market."²⁷

12 **Q: Have you looked at the participation levels GMP achieved in 1997 for T8s in**
13 **the Equipment Replacement program?**

14 A: Yes. While they have gone up a little bit since 1995 to 20% of the market, they are
15 still only about one third of the estimated 1995 penetration of T8s.²⁸

16 **Q: What do you recommend as a free ridership factor for purposes of calculating**
17 **ACE?**

18 A: The actual free ridership is likely to be somewhere between 54% and 100% for
19 ballasts and 57% to 100% for fixtures. The low end reflects the natural penetration,

Evaluation, prepared for GMP and CVPS, June 30, 1997.

²⁶ Pacific Energy Associates, Inc., *C&I Market-Driven Programs Market Assessment and Process Evaluation*, prepared for GMP and CVPS, June 30, 1997, p. 38

²⁷ *Op. cit.*, p. 39

²⁸ In fact, since the natural penetration of T8s has almost certainly gone up since 1995, the actual impact GMP is making on this market is likely to be even less than one third.

1 and would be accurate if the customers choosing to participate were evenly
2 distributed between those already planning to install T8s and those not. In actuality,
3 those 54-57% of customers *already* planning to purchase T8s are the customers
4 most likely to participate in the program. Under the extreme case that only these
5 customers collected incentives, free ridership would be 100%. Better program
6 design that encourages comprehensive lighting approaches and more aggressively
7 targets those customers not already planning to install T8s would reduce free
8 ridership. For purposes of adjusting ACE I conservatively propose use of the lower
9 bounds of 54% and 57%.

10 **Q: Did the DPS agree to the 15% free ridership number?**

11 A: The DPS has not opposed use of 15%, pending M&E results. Prospective free
12 ridership assumptions may be appropriate for setting goals. However, ACE is
13 intended to remove the inherent utility disincentive to pursue DSM by ensuring the
14 utility's shareholders are not hurt by increased savings. ACE calculations should
15 therefore use the best available information to determine actual savings, regardless
16 of prior assumptions.

17 **Q: What is the ACE adjustment you propose for T8s?**

18 A: The net reduction in T8 annualized savings during the cost recovery period is 233
19 MWh. I estimate an ACE adjustment of \$11,511.

20 **Q: What are your concerns regarding T12 measures?**

21 A: GMP offered incentives for T12 electronic ballasts and fixtures as well as T8s during
22 the cost recovery period. Except for special applications such as low temperature
23 environments, GMP should not be promoting T12s at all. They represent standard
24 technology, and are economically suboptimal measures (as compared to T8s). GMP
25 should eliminate these rebates.

1 **Q: Does this mean GMP should receive no ACE for T12s?**

2 A: No. Given that GMP did presumably induce some people to install electronic T12
3 ballasts rather than magnetic ballasts, some savings were captured. I have calculated
4 a free ridership factor of 28% for high output (HO) T12s based on the ratio of T12
5 ballast and fixture sales that are electronic identified in GMP's evaluation. HO lamps
6 are typically used in low temperature applications, where T8s are not viable. For the
7 non-HO T12s, I estimate free ridership factors of 67% for ballasts and 70% for
8 fixtures. This represents the 1995-1996 penetration identified in GMP's evaluation of
9 electronic ballasts, and is a lower bound estimate similar to that proposed for T8s.

10 **Q: What is the ACE adjustment you propose for T12s?**

11 A: The net reduction in T12 annualized savings during the cost recovery period is 21
12 MWh. I propose an adjustment of \$1,035.

13 **Q: What are your concerns regarding motor free ridership?**

14 A: As with T8 lighting, GMP has failed to capture even the existing penetration of high
15 efficiency (premium) motors within its programs.²⁹ GMP and CVPS's joint
16 evaluation indicates the natural penetration of premium motors is 44%.³⁰ Segmented
17 by size, the penetration is 42% and 72% for small and large motors, respectively
18 (less or greater than 20 horsepower).

19 In 1997 GMP participants in the Equipment Replacement and New
20 Construction Programs installed a total of 156 motors. This is only 7.2% of the

²⁹ The term "energy efficient" motor is generally used in the industry to designate the minimum efficiency equipment allowed under Federal standards. The term "premium" refers to high efficiency motors.

³⁰ Pacific Energy Associates, *C&I Market-Driven Programs Market Assessment and Process Evaluation*, prepared for GMP and CVPS, June 30, 1997, p. 60

1 estimated 2,153 motors of *any* efficiency sold in GMP territory each year.³¹ It is
2 only *one sixth* of the penetration of *premium* motors sold in 1995-1996. As with
3 lighting, it is clear that GMP's program is not substantially impacting the natural
4 market for motors.

5 **Q: What free ridership estimates do you recommend for motors?**

6 A: As with my proposal for lighting, I conservatively propose the lower bounds of 42%
7 and 72% for small and large motors, respectively.

8 **Q: What is the proposed ACE adjustment for motor free ridership?**

9 A: Applying the above free ridership factors, the net reduction in annualized savings
10 during the cost recovery period is 121 MWh. I propose a reduction in ACE of
11 \$5,977 .

12 **Q: Do you have any other concerns about GMP's savings claims for motors?**

13 A: Yes. Not only did GMP fail to capture a significant portion of the new motor
14 purchases in its programs, it overestimated gross savings (unadjusted for free riders)
15 for the motors it did capture and failed to encourage customers to install optimally
16 cost effective efficiency levels.

17 *B. Overstatement and under-capture of Motor Savings Through Failure to*
18 *Use Proper Baselines and Minimum Efficiency Criteria*

19 **Q: Why do you claim that GMP overestimated gross savings?**

20 A: During the cost recovery period GMP continued to use assumptions about motor
21 baselines developed in 1991.³² In 1992 the federal government passed the Energy

³¹ *Op. cit.*, p. 64.

³² Provided in response to DPS 3-47.

1 Policy Act (EPACT), calling for motor efficiency standards. The EPACT standards
2 went into effect in October of 1997, during the cost recovery period. As of early
3 1997, a number of utilities had already modified baseline efficiency assumptions to
4 be consistent with EPACT. As indicated above, the DPS encouraged Vermont
5 utilities to increase the baseline assumptions to reflect EPACT levels as part of the
6 core working group process in 1996.

7 **Q: Do you have any concerns about GMP's minimum efficiency criteria?**

8 A: Yes. The *baseline efficiency* is the assumed efficiency of standard equipment
9 customers would install absent a program. The *minimum efficiency criteria*
10 represent the threshold efficiency levels that customers must exceed in order to
11 qualify for a rebate. The result of setting higher minimum efficiency criteria is to
12 encourage customers to install the maximum cost effective motors, and to eliminate
13 free ridership from participation of customers that are naturally installing motors just
14 slightly above baseline efficiencies.

15 In 1997 GMP's minimum efficiency criteria was very similar to the EPACT
16 standards that went into effect in October of that year. As a result, they were likely
17 very close to the actual baseline. Therefore, even those customers who did
18 participate in the motors portion of the C&I programs may not have been induced to
19 substantially increase their level of efficiency.

20 In addition to revising baseline assumptions, the DPS encouraged GMP and
21 other utilities to substantially raise the minimum efficiency criteria to those being
22 promoted by the Consortium for Energy Efficiency (CEE) in 1996. This would have
23 both captured greater savings and substantially reduced the high free ridership that
24 resulted from GMP's program.

25 **Q: What is the CEE efficiency criteria?**

1 A: CEE has developed minimum efficiency criteria for DSM programs in the hopes of
2 encouraging all or most utilities to adopt consistent standards. This would result in
3 consistent messages to manufacturers, contractors, vendors, and other trade allies,
4 thereby promoting market transformation, a key goal of DSM.

5 Not only did the DPS encourage adoption of these standards, GMP's own
6 consultant recommended the same thing in early 1997:³³

7 The Consortium for Energy Efficiency (CEE) has developed a
8 standard for motor programs which has been adopted by many
9 utilities, including most of the Northwest, Wisconsin, much of
10 Southern New England, and at least one utility in New Jersey. This
11 standard sets a higher threshold than the EPACT standard, and will
12 save significant energy beyond that standard. PEA believes that this
13 standard is more advisable for program *activity in 1997 and beyond*.
14 (Emphasis added.)³⁴

15 **Q: What is the overstatement of savings from GMP's reliance on a lower**
16 **baseline?**

17 A: I do not have all the project files to determine the actual motor efficiencies installed
18 by each participant. However, I have calculated an average percentage savings
19 reduction assuming the average efficiency of motors installed in the C&I programs is
20 midway between GMP's minimum criteria and the CEE criteria. The actual savings
21 reduction is likely to be considerably higher. This is because many program measure
22 installations tend to just exceed the minimum efficiency criteria when an incentive
23 structure that pays the same amount regardless of measure efficiency — as GMP
24 does — is used. The reduction in annualized motor savings, *in addition to the motor*

³³ The final report was dated June 1997. However, a draft was provided to GMP in early spring.

³⁴ Pacific Energy Associates, *C&I Market-Driven Programs Market Assessment and Process Evaluation*, prepared for GMP and CVPS, June 30, 1997, p. 55

1 *savings adjustment proposed above*, is 107 MWh. I propose a reduction in ACE of
2 \$5,310.

3 C. *Overstatement of Savings from Variable Speed Drives*

4 **Q: Explain your concern with the ACE savings claimed from variable speed**
5 **drives.**

6 A: GMP is claiming gross savings (unadjusted for free riders) of 1,483 MWh from
7 variable speed drives in the Equipment Replacement Program during the cost
8 recovery period. This represents 32% of the total gross savings for this program,
9 and 24% of all C&I savings in the cost recovery period. Variable speed drives are
10 used to electronically adjust motors to meet partial loads. Typical applications are
11 for HVAC fans and pumps, and process motor loads. Under theoretical conditions,
12 centrifugal motor power requirements will vary proportional to the *cube* of the
13 loading on the motor. However, in practice, this is rarely the case.

14 Empirical evidence has shown that energy for pumps tends to vary with the
15 *square* of the loading. For fan applications, the exponent is approximately 2.5. For
16 constant torque loads (e.g., motive power), there is a linear relationship (the
17 exponent is 1). At least in some cases GMP has based its calculations on the “cube
18 law,” thereby overstating actual savings. I have recalculated the VSD savings from
19 GMP’s single largest project. This customer installed VSDs to control fan
20 applications. I have reviewed some of the other VSD projects, a substantial portion
21 of which are pumps and constant torque loads. I am unable to determine whether
22 GMP relied on a cube relationship or not. I therefore propose only a reduction for
23 the single large project. The reduction for this project is 77 MWh. This computes to
24 an ACE adjustment of \$3,806. If GMP has used the cube relationship on its other
25 projects, the reduction is likely to be 5 to 10 times higher.

1 **Q: For GMP's single largest project, what was the basis for GMP's savings**
2 **estimate?**

3 A: GMP relied on an analysis performed by the customer's VSD vendor. Mr. Grimason
4 confirmed in his deposition³⁵ that GMP relies on vendor or contractor calculations
5 for custom measures in some cases.

6 **Q: Do you have any concerns with this approach?**

7 A: Yes. In my experience, manufacturers and vendors will often present overly
8 optimistic estimates of energy savings from their products. Vendors and
9 manufacturers use these estimates for marketing in an unregulated context. They
10 have every incentive to use optimistic assumptions, and these estimates are subject
11 to much less scrutiny than should be brought to bear when determining ACE.

12 **Q: Do you recommend a solution?**

13 A: Yes. GMP has claimed very large savings in its C&I programs based only on
14 engineering algorithms. A large portion of these savings derive from a few very large
15 custom projects. In none of these cases has GMP performed any independent
16 verification of its savings claims.³⁶ Studies have shown that engineering estimates
17 often diverge substantially from more detailed impact evaluation estimates of
18 savings.³⁷ GMP spending on evaluation has dropped to virtually nothing in recent
19 years.³⁸ GMP should be directed to perform or review appropriate impact
20 evaluations and adjust savings estimates accordingly in the future.

³⁵ Grimason 8/31/98 deposition, tr. p.64, line 21 to p. 65, line 2.

³⁶ Grimason 8/31/98 deposition, tr. p.91, lines 7 to 12.

³⁷ See for example: Nadel, Steven, *Engineering Estimates vs. Impact Evaluation Results: How Do They Compare and Why?*, American Council for an Energy-Efficient Economy, 1991.

³⁸ In 1993 GMP sent \$420,765 on DSM evaluation. In 1997 it spent only \$20,534 (1993 and 1997

1 D. *Overstatement of Savings from a Large Motel Project*

2 **Q: Please describe the large motel project.**

3 A: During the cost recovery period a large motel customer installed new high efficiency
4 packaged terminal heat pump (PTHP) units in individual rooms, along with
5 occupancy thermostats. The occupancy thermostats are designed to automatically
6 setback the room temperature when the room is unoccupied. GMP's estimated
7 savings from this project are 235 MWh.

8 **Q: Why do you believe GMP should not recover ACE from this project?**

9 A: An internal GMP memo (Exhibit DPS__PHM-11) indicates the customer installed
10 the measures "without GMP involvement." As a result, GMP did not provide any
11 incentives for the measures. GMP claims, however, that it should receive savings
12 credit because of previous technical assistance provided to the customer. My review
13 of the entire project file provided to me by the Company does not justify GMP's
14 claim.

15 **Q: Please elaborate on what you found in the project file.**

16 A: GMP performed an energy analysis for the motel in January 1996. Based on this
17 analysis GMP recommended that the customer install lighting measures and
18 geothermal heat pumps. The analysis never recommended high efficiency PTHPs.
19 Rather, it compared three systems: geothermal heat pumps, gas fired heaters with
20 air conditioning, and standard-efficiency PTHPs. While the installed costs for all
21 three systems (including the baseline system) include the cost of occupancy
22 thermostats, the report never discussed occupancy thermostats. They were not
23 specifically recommended, there was no analysis of the savings or payback from

1 them, and there was no mention of what the alternative to occupancy thermostats
2 might be. This, combined with the fact that the customer did not even inquire about
3 the possibility of an incentive makes it unlikely the customer's actions are directly
4 attributable to GMP intervention.

5 **Q: Do you have any other concerns with GMP's 1996 analysis for the motel?**

6 A: Yes. GMP recommended the geothermal heat pump, and offered an incentive for it.
7 However, no societal screening for the geothermal heat pump, or any alternative
8 systems, are included in the file. It is not clear from the file whether the geothermal
9 system was the optimal alternative, or even if it was societally cost-effective. In
10 addition the geothermal system had a significantly higher first cost than the
11 alternatives analyzed, the longest customer payback, and the highest overall
12 customer life-cycle cost.

13 **Q: Do you have any evidence that the geothermal heat pump system was not the**
14 **optimally cost-effective alternative?**

15 A: Yes. I have screened both the geothermal heat pump and the combination gas
16 heating/electric air conditioning systems. These were screened using the 1997 GMP
17 screening tool provided in response to DPS 4-3, uses on the avoided costs stipulated
18 to in the 5857 MOU. The screening also relied on all of GMP's assumptions used in
19 its economic analysis provided to the customer. The screening showed that the
20 geothermal heat pump system was not cost-effective. It had a benefit-cost ratio of
21 0.82, with *negative* net benefits of \$80,000. The gas system was cost effective, with
22 a benefit-cost ratio of 1.05 and positive net benefits of \$21,000.

23 **Q: In addition to GMP promoting a measure that was not cost-effective, do you**
24 **have any other concerns about GMP's analysis and recommendations to the**
25 **customer?**

1 A: Yes. Not only does the report recommend the non-cost-effective geothermal heat
2 pump system, it seems to intentionally steer the customer away from considering the
3 cost effective gas system, which cost less and paid back sooner. For example, it
4 states:

5 We recognize that the geothermal systems historically cost more to
6 install than fossil fuel heating systems. However, we believe that energy
7 and operating savings as well as environmental benefits will encourage
8 people to choose the *superior* geothermal heat pump technology.”
9 (Emphasis added.)³⁹

10 **Q: Were there other aspects to GMP's analysis that discouraged the customer**
11 **from selecting the gas system?**

12 A: Yes. The analysis included a \$25/unit (total cost of \$4,950) additional annual cost
13 for tuning up the gas system. No costs for additional maintenance were attributed to
14 the geothermal system, a much less mature technology. Under normal operating
15 conditions, gas heating units would not require any additional maintenance cost over
16 and above that already incurred for annual maintenance on the air conditioning
17 portion. This extra maintenance cost on the gas system increased total operating
18 costs for this system by over 25%. After removing the maintenance costs, the gas
19 system cost-effectiveness jumps to a 1.16 benefit cost ratio and \$67,000 of net
20 benefits.

21 **Q: Do you believe GMP biased the analysis in any other ways?**

22 A: Yes. The customer's existing heating system was electric resistance. In the economic
23 analysis provided to the customer, the incremental costs over a standard efficiency
24 heat pump system were used. This assumes the customer was already at least going
25 to install standard efficiency heat pumps. However, the analysis calculates the

³⁹ Cover letter for energy analysis report provided to the motel, January 23, 1996.

1 *savings* from the existing electric resistance system, rather than the incremental
2 savings from the standard efficiency heat pump. This results in savings estimates
3 approximately eight times higher than they would be incrementally. As a result,
4 GMP estimated the incremental customer payback of the geothermal system to be
5 much sooner than it really would have been.

6 **Q: Do you have any concerns about the occupancy sensor thermostats?**

7 A: Yes. It is likely that occupancy thermostats will save a considerably smaller portion
8 of the heating energy with the PTHPs than they would have with either the original
9 electric resistance heat, the geothermal or the gas-fired systems. This is because
10 when heat pumps are turned on after a temperature setback, they often must use
11 electric resistance back-up heating to meet the additional heating load. This is likely
12 to substantially undermine the expected savings from the customer's actual
13 installation. It does not appear that GMP took the back-up heating into account
14 when estimating the savings for this project

15 **Q: Please summarize your concerns about the motel project.**

16 A: There are three important conclusions. First, the motel installed measures in 1997
17 that were not specifically recommended or mentioned in GMP's energy analysis
18 provided to the customer over a full year prior to the cost recovery period. In
19 addition, the customer did not even inquire with GMP about the possibility of an
20 incentive. Rather, they installed the measures with "no GMP involvement." GMP is
21 now trying to take credit for savings simply because it had a prior relationship with
22 the customer.

23 Second, GMP did not adequately analyze and promote the societally optimal
24 measures at the time the analysis was done for the customer. They recommended
25 and offered an incentive for a non-cost-effective electric heating technology, while

1 discouraging the customer from installing a cost-effective gas system. They also
2 presented the customer with a flawed economic analysis unduly favoring the electric
3 system.

4 Third, the savings GMP is claiming are overestimated.

5 **Q: What is your proposed ACE adjustment for this project?**

6 A: The reduction in annualized savings is 235 MWh. I estimate an ACE adjustment of
7 \$11,629.

8 *E. Overstatement of Savings from ACT 250 Customers*

9 **Q: Please explain your concern with the claims for ACT 250 savings in the C&I**
10 **New Construction program.**

11 A: Thirty-eight percent of the savings for the C&I New Construction Program in 1997
12 are attributable to lighting savings among ACT 250 customers. GMP has provided
13 the department with its proposed guidelines for claiming savings from ACT 250
14 projects (DPS 4-50a, attached as Exhibit DPS__PHM-12). While these guidelines
15 were never formally approved by the DPS, GMP confirms they use them. The
16 guidelines specifically indicate that all ACT 250 lighting savings be determined on a
17 per "fixture basis." Witness Grimson confirms that this is the standard GMP
18 method for determining ACT 250 lighting savings, although he acknowledges that
19 there may be a few instances where a lighting power allowance approach is used
20 (see Grimson 8/31/98 deposition p 80 ln 22, p. 82, line 1-13 attached as Exhibit
21 DPS__PHM-13) A lighting power allowance refers to a watts per square foot
22 standard, as developed in 1989 by ASHRAE.

1 I have reviewed all the ACT 250 project files provided by GMP for the cost
2 recovery period.⁴⁰ In fact, GMP fails to claim *any* lighting savings on a per “fixture”
3 basis. Rather, they simply take credit for lighting savings whenever a building’s
4 lighting is designed for fewer watts per square foot than that specified in ASHRAE
5 90.1.

6 **Q: Why isn’t this appropriate?**

7 A: First of all, the ASHRAE standard is almost ten years old. ASHRAE standards are
8 consensus standards that generally serve to prevent the worst practices, but rarely
9 do they promote the most cost-effective approaches, even when they are first
10 developed. In 1989 T8 lighting technology was still in its infancy, as were electronic
11 ballasts. In fact, the standard even predates federal standards eliminating the most
12 inefficient T12 lamps and ballasts.

13 More importantly, review of all the ACT 250 project files available from GMP
14 shows that in *every* case, the actual lighting equipment installed represented widely
15 accepted, common-practice technologies that would be considered a minimum
16 standard for complying with ACT 250, which requires the lowest life-cycle cost. In
17 addition, the files also make clear that GMP’s involvement had virtually no influence
18 on the lighting design of these projects, as I show below.

⁴⁰ The DPS requested all ACT 250 project files for the cost recovery period. The files received do not include 2 projects listed in the database.

1 **Q: Please elaborate on your claim that the lighting technologies installed met, but**
2 **did not exceed ACT 250.**

3 A: The lighting technologies installed were generally T8 fluorescent lamps with
4 electronic ballasts, LED exit signs, compact fluorescents, and metal halide high-bay
5 fixtures. These are all highly cost-effective, both from a societal and a customer life-
6 cycle-cost basis. They are also all mature technologies. In fact, the largest 1997
7 ACT 250 lighting project GMP claimed savings for also included some T12
8 fluorescent lighting and some incandescent technologies, both technologies that
9 should not even meet ACT 250 criteria.⁴¹ Had GMP used an appropriate “per
10 fixture basis,” it would not have found any of these measures to qualify for savings
11 over and above those normally expected from ACT 250.

12 **Q: What types of technologies would you expect to qualify for additional savings**
13 **over and above ACT 250?**

14 A: I would expect that if GMP had provided aggressive technical assistance that
15 resulted in a customer installing a truly “state-of-the-art” lighting system they should
16 claim savings. An example might be daylighting systems with dimming ballasts
17 automatically controlled by photocells. I saw no mention of any custom lighting
18 technologies in any of the ACT 250 files provided by GMP.

19 **Q: What do you base your claim that GMP had virtually no influence on the ACT**
20 **250 lighting designs?**

21 A: I thoroughly reviewed all ACT 250 projects provided by GMP. In many cases, the
22 only correspondence between GMP and the customer was the mailing by GMP of
23 standard literature explaining that it could provide services, and describing ACT 250

⁴¹ This largest project reviewed was dated just prior to the cost recovery period.

1 requirements. Even when GMP claimed the highest level of involvement⁴² there is
2 clear evidence that customers had already planned their lighting systems. For
3 example, Exhibit DPS__PHM-14 shows that GMP simply responded to the
4 customer's initially proposed lighting design with a comment that "we have no
5 recommendations for this [lighting] system." Yet, GMP claimed credit for 87% of
6 the lighting savings from these T8s and metal halide fixtures, as compared to the
7 ASHRAE 1989 standard.

8 **Q: What are your proposed ACE adjustments for Act 250 lighting projects?**

9 A: I propose to eliminate the savings from Act 250 lighting projects during the cost
10 recovery period. This results in a net decrease in annualized savings of 257 MWh
11 and a concomitant ACE adjustment of \$12,722.

12 **Q: Do you have any other concerns about GMP's activities related to ACT 250**
13 **projects?**

14 A: Yes. GMP should not claim ACE for savings from ACT 250 customers that do not
15 go beyond the minimum level of efficiency required by ACT 250 unless the savings
16 are clearly and directly attributable to GMP. Perhaps even more disturbing is that the
17 project files indicate that GMP is failing to aggressively and creatively encourage
18 customers to go beyond what they are generally planning. Most GMP
19 correspondence refers to simply confirming that the systems initially proposed by the
20 customer will qualify for a permit. Rarely does GMP propose a new and more
21 efficient alternative unless the customer is clearly in violation and unable to receive a
22 permit.

⁴²GMP uses "involvement factors" ranging from 25% to 87% that it applies to the gross savings based on the level of involvement with the customer (see Exhibit DPS__PHM-15 for an explanation of these factors).

1 **Q: Have you reviewed GMP's internal guidelines for working with ACT 250**
2 **customers and for claiming savings?**

3 A: Yes. Exhibit DPS_PHM-15 is a memorandum from Mr. Grimason to the Energy
4 Services Staff.⁴³ This memo confirms that it is GMP's policy to claim a minimum of
5 25% involvement factor even when the "customer does no (sic) respond to our calls
6 or does not want our help." The guidelines indicate GMP can claim as much as 50%
7 savings when GMP reviews the project and simply confirms "that the project is
8 already in compliance without any changes." The guidelines indicate GMP should
9 only claim 87% savings for "custom measures" when a life cycle cost analysis is
10 performed by GMP.

11 **Q: Has GMP followed these guidelines?**

12 A: Not completely. The example discussed above is an example of GMP simply
13 indicating compliance, yet claiming 87% savings. They did not perform any custom
14 lighting life cycle cost analyses. I have not tabulated all instances of non-compliance.

15 **Q: Do you believe this is an appropriate guideline?**

16 A: No. I believe it is entirely appropriate for GMP to provide technical services to ACT
17 250 customers, and to assist them in identifying and analyzing cost effective savings.
18 I further believe that GMP should be entitled to recoup its direct costs of providing
19 these services from ratepayers, providing it is offering a quality service and
20 attempting to identify all cost effective opportunities for the customer. However,
21 GMP should only be able to claim savings for ACE where it has clearly had a
22 significant role in influencing the customer capture additional savings.

23 ACE is designed to make the utility "whole" for actual and measurable
24 reductions in sales attributable to its efforts. It is inappropriate for ratepayers to

⁴³ Provided by GMP in response to DPS 1-9 and 1-10 at a site visit on 7/13/98.

1 compensate GMP for 50 to 87% of “lost revenue” when GMP has simply confirmed
2 that a customer’s plans are already in compliance, and has made no attempts to
3 capture additional savings. For ratepayers to “reimburse” GMP 25% for a project
4 where the customer does not even communicate with GMP is even less reasonable.

5 **Q: Do you have concerns that this approach is continuing?**

6 A: Yes. Not only is it continuing, it appears to be expanding. Exhibit DPS__PHM-16 is
7 an internal GMP e-mail from Dan Gaherty claiming that GMP should, at a minimum,
8 claim lighting savings for *all* ACT 250 referrals, regardless of GMP’s involvement.
9 It notes that this “could be a good source of CINC program savings for 1998.”

10 **Q: Is there any evidence that savings claims from ACT 250 customers might be**
11 **reducing the legitimate capture of cost effective lost opportunity savings from**
12 **non-Act 250 customers?**

13 A: Yes. In his testimony Witness Grimason attributed part of the short fall in DSM
14 spending in 1997 to the elimination of incentives for ACT 250 customers. In his
15 8/31/98 deposition, Mr. Grimason was asked to explain this, given the very minimal
16 incentives paid to ACT 250 projects in 1996. He explained that it was not because
17 GMP had inadvertently budgeted expenditures for ACT 250 incentives, but rather
18 because the substantial savings achieved from ACT 250 customers *reduced the need*
19 *to spend money to capture savings from non-ACT 250 customers to meet the 1997*
20 *goals* (deposition tr., p. 72 line 6 - p. 74, line 3, attached as Exhibit DPS__PHM-
21 17). It appears that GMP made a conscious decision to less aggressively pursue non-
22 Act 250 savings because of its self-developed policy toward claiming ACT 250
23 lighting savings.

24 **Q: What do you conclude from your analysis of ACT 250 projects?**

25 A: My review of these projects makes clear:

- 1 • GMP's CINC savings claims for the cost recovery period are inflated. Actual
- 2 savings are only about 60% of GMP's claims.
- 3 • ACE for the CINC program should be adjusted accordingly.
- 4 • GMP is goal-driven. Its focus is on counting savings, not on aggressively
- 5 pursuing all cost effective savings opportunities.
- 6 • GMP is manipulating the ACT 250 process to further its goal-driven approach.
- 7 This manipulation is undermining the capture of other cost effective lost
- 8 opportunity savings.
- 9 • GMP is intentionally declining to pursue cost effective lost opportunity savings
- 10 among non-Act 250 customers because of its goal-driven policy, and self-
- 11 designed Act 250 savings claim guidelines.
- 12 • GMP's actual services to ACT 250 customers are not resulting in significant
- 13 additional savings, and represent a substantial lost opportunity to inform
- 14 customers of creative and cost effective approaches to exceed ACT 250.

15 **Q: Does this conclude your testimony?**

16 A: Yes.